TAMARACK RESORT (PWS 4430100)

SOURCE WATER ASSESSMENT REPORT

June 15, 2006

State of Idaho
Department of Environmental Quality

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Executive Summary

The Environmental Protection Agency (EPA), under the Safe Drinking Water Act Amendments of 1996, is requiring the State of Idaho to assess the potential susceptibility to contamination of all public water systems (PWS).

The primary objective of these source water assessments is to provide information that public water systems can use to develop and implement local Drinking Water Protection Plans. By evaluating land use, system construction, and existing hydrologic and geologic conditions, systems are scored *high*, *medium*, or *low* in terms of their susceptibility to contamination.

What Was Assessed

This report evaluates Well #4 and Well #7 of the Tamarack Resort community water system (PWS No. 4430100), located 5 miles southwest of Donnelly, Idaho. According to the 9/15/2005 Sanitary Survey, the system serves approximately 26 people through 1 metered connection. At present, the served population is assumed to be approaching 1,000.

How Susceptibility Scores Were Determined

Well susceptibility was scored in three areas:

- Well system construction
- Land use (type and amount) above the well's aquifer. Land use can differ among wells, so separate scores are given for each of four types of contaminants:
  - Inorganic contaminants (IOCs), such as nitrates and arsenic
  - Volatile organic contaminants (VOCs), such as petroleum products
  - Synthetic organic contaminants (SOCs), such as pesticides
  - Microbial contaminants, such as bacteria
- Hydrologic and geologic conditions surrounding the well

Scores for This Assessment

The final scores are as follows:

Drinking Water Source	Susceptibility Scores[1]									
	System Construction	Potential Contaminant Inventory/Land Use				Hydrologic Sensitivity	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #4	L	M	M	M	M	M	M	L	M	L
Well #7	L	M	M	M	M	M	M	M	M	M

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Final susceptibility for Well #4 rated **moderate** for IOCs and SOCs and low for VOCs and microbial contaminants. Final susceptibility for Well #7 rated **moderate** for IOCs, VOCs, SOCs, and microbial contaminants.

Hydrologic sensitivity rated **moderate susceptibility** both wells, and system construction rated **low susceptibility** for both wells. Based upon the number and type of potential contaminant sources found within three time-of-travel zones (zones indicating the number of years necessary for a particle of water to reach a well), land use for both wells rated **moderate susceptibility** for IOCs, VOCs, SOCs, and microbial bacteria. See Table 3 and Table 4, page 12, for a complete listing of these sources.

Summary of Laboratory Test Results for the System

A review of the system's laboratory tests, using the Safe Drinking Water Information System State (SDWISS), revealed the following:

- Tested water revealed no VOCs, SOCs, or repeat detections of microbial bacteria in Well #4 or Well #7.
- The IOCs fluoride, sodium, nitrates, nickel, and barium have been detected in tested water. Concentrations of each potential contaminant are below maximum contaminant levels.

How to Use These Results

This assessment is provided as information regarding Tamarack Resort's drinking water and should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source.

DEQ strongly encourages each PWS to use the assessment report to develop a *Source Water Protection Plan*, which is a community-derived and proactive strategy to protect drinking water. Protection plans can help avoid drinking water contamination and reduce expensive treatment/replacement costs.

Protection plans can also help educate the served community. Many people have an "out of sight, out of mind" mentality, but improper disposal of certain chemicals can cause health impacts. For instance, concentrations of some contaminants, as small as a few parts-per-billion, can be higher than allowable limits.

These results should not be used as an absolute measure of risk, nor should they be used to undermine public confidence in the water system. A particular rating DOES NOT imply that any regulatory or legal actions will occur.

Suggested Activities to Protect Your Drinking Water

Drinking water protection activities should first focus on correcting any deficiencies outlined in the *sanitary survey*. Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies, even though these strategies may not yield results in the near term.

System operators should do the following:

- Maintain a 50-foot radius (IDAPA 58.01.08.900.01) clear of all potential contaminants around the wellhead. If the pump house resides within this distance. It is important to keep the pump house clean and to not store disinfection chemicals or other chemicals there. The 50-foot buffer also reduces potential contamination related to chemical application or irrigation practices; the water system should restrict chemical application and activities near the wellhead.
- Identify and consider all possible sources of contamination not identified in this report, such as septic system effluent and document those sources to identify potential contaminant threats that could impact the Tamarack Resort drinking water wells.
- Correct any deficiencies included in the sanitary surveys—such as proper venting, drainage, and smooth nosed sample taps—as part of the water system's drinking water protection efforts.
- Carefully monitor and deal with any contaminant spills within the well's capture zone.
- Work with state and local agencies if the well's capture zone(s) are outside the direct jurisdiction of your PWS.
- Locate new wells in areas with as few potential sources of contamination as possible, and ensure that each new site is reserved and protected.

A strong public education program should also be a primary focus of any drinking water protection plan, as most well capture zones contain at least some urban and residential land uses. Public education topics could include:

- Proper lawn and garden care practices
- Household hazardous waste disposal methods
- Proper care and maintenance of septic systems
- The importance of water conservation

Resources and Assistance

There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil and Water Conservation District, and the Natural Resources Conservation Service.

For assistance in developing protection strategies, contact DEQ's Boise Regional Office or the Idaho Rural Water Association.

Boise Regional DEQ Office	(208) 373-0550
State DEQ Office	(208) 373-0502

Website: http://www.deq.idaho.gov/

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at 1-208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

SOURCE WATER ASSESSMENT FOR THE TAMARACK RESORT WATER SYSTEM IN VALLEY COUNTY, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are shown in Figure 1. The list of significant potential contaminant source categories used to develop the assessment is included as Table 3 in Appendix A.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public water system (PWS) source in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area; sensitivity factors associated with the drinking water source, and local aquifer characteristics. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water supply system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the PWS.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ also encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community and be based upon its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

Tamarack Resort, PWS# 4430100, is a community drinking water system located in Valley County (Figure 1). In September 2005, the water system reported serving approximately 26 people through 1 metered connection.

According to the State Safe Drinking Water Information System, no volatile organic contaminants (VOCs), synthetic organic contaminants (SOCs), or microbial bacteria have ever been detected in any of the wells. The inorganic contaminants (IOCs) fluoride, sodium, nitrate, nickel, and barium have been detected in tested water; however concentrations of each have been below maximum contaminant levels (MCLs) set by the Environmental Protection Agency (EPA).

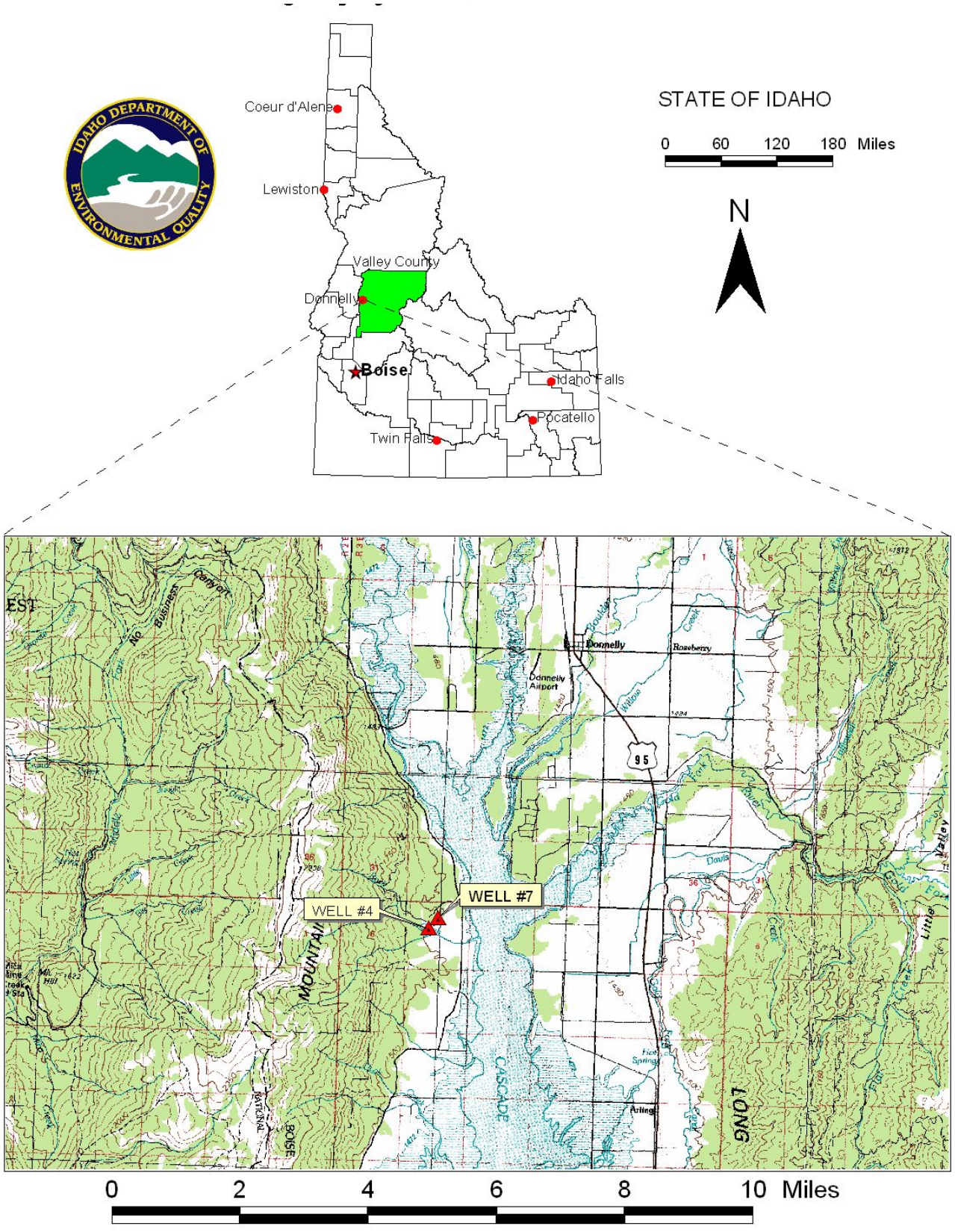

Figure 1. Geographic location of Tamarack Resort, PWS# 4430100.

Defining the Zones of Contribution—Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer.

DEQ defined the zones of water contribution by using a refined computer model approved by the EPA in determining the 3-year (Zone IB), 6-year (Zone II), and 10-year (Zone III) TOT zones for water associated with the Tamarack Resort water system.

The computer model used site-specific data, assimilated from a variety of sources, including well logs (when available) and hydrogeologic reports.

The Tamarack Resort Water System Wells are completed in sands at depths between 305-412 feet below ground surface (bgs) (Well #4) and 193-314 feet bgs (Well #7). The delineation extends from Cascade Reservoir's edge to West Mountain's Ridge, a distance of approximately 3 miles, and encompasses an area up to approximately 2 miles wide (see Figure 2). The actual data used to determine the source water assessment delineation area is available from DEQ upon request (DEQ, 2006).

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources.

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The potential contaminant source locations within the delineation areas were obtained from existing databases and field surveys conducted by DEQ.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used by the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory for Well #4 and Well #7 was conducted during May 2006. For reference, the well location, TOT zones, and potential contaminant sources are included in Figure 2, and Appendix A, Table 3.

- The first phase involved identifying and documenting potential contaminant sources within the water system's source water assessment area through the use of computer databases and geographic information system (GIS) maps developed by DEQ.
- The second phase, or *enhanced*, portion of the inventory involved contacting the water system.

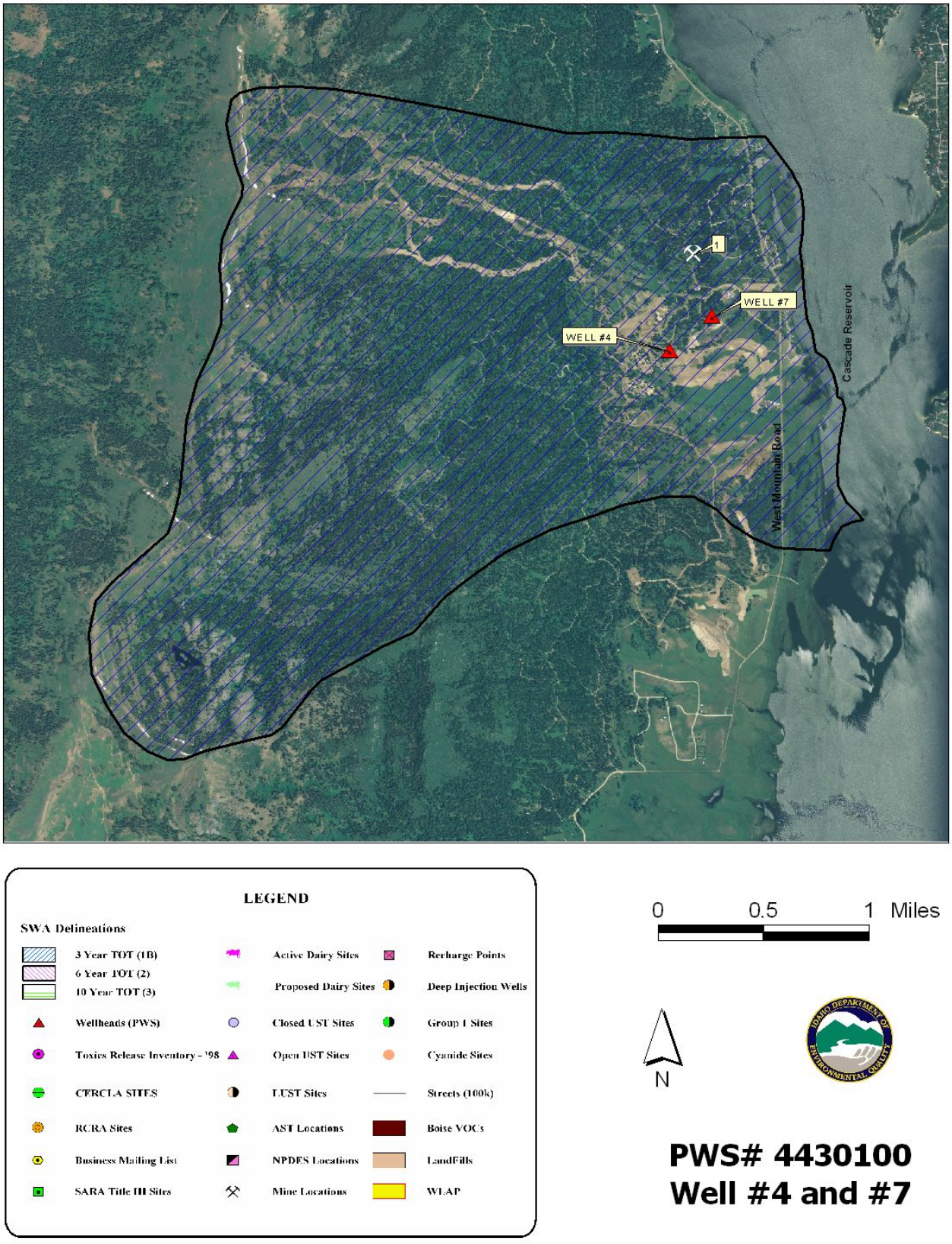

Figure 2. Tamarack Resort Well #4 and Well #7 delineation and potential contaminant sources.

Section 3. Susceptibility Analyses

The susceptibility of the well to contamination was ranked as *high*, *moderate*, or *low* risk according to the following considerations:

- Hydrologic characteristics
- Physical integrity of the well
- Land use characteristics
- Potentially significant contaminant sources

The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgment. The following summaries describe the rationale for the susceptibility ranking. The susceptibility analysis worksheets have been included in Appendix B of this assessment.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors:

- Surface soil composition
- Material in the vadose zone (between the land surface and the water table)
- Depth to first ground water
- Presence of an aquitard (50 feet of impermeable materials above the producing zone of the well)

Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

The hydrologic sensitivity rated **moderate susceptibility** for both wells. According to the Natural Resource Conservation Service, area soils are classified as *moderately- to well- drained.* According to their well logs, the water table depth in each well is less than 300 feet, aquitards are present in both wells, and the vadose zone in each well is composed of a high percentage of impermeable materials.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system that can better protect the water. If the casing and annular seal both extend into a low permeability unit then the possibility of cross contamination from other aquifer layers is reduced and the system construction score goes down. If the highest production interval is greater than 100 feet below the water table, then the system is considered to have better buffering capacity. When information was adequate, a determination was made as to whether the casing and annular seals extend into low permeability units and whether current PWS construction standards are met.

The system construction scores rated **low susceptibility** for Well #4 and Well #7.

Both wells are located outside of a 100-year floodplain. A sanitary survey indicated that the wellheads and surface seals of each well are maintained. According to their well logs, the casings and annular seals in both wells extend into low permeable units. The highest production comes from more than 100 feet below static water levels in Well #4, but not in Well #7.

According to its well log, Well #4 was drilled to a depth of 412 feet bgs. A 10-inch casing (0.365 inches thick) was placed to a depth of 302 feet bgs, as was a bentonite annular seal. Five screened intervals of 6-inch casing were placed between 305 feet bgs and 402 feet bgs. The water table was encountered at 137 feet bgs.

According to its well log, Well #7 was drilled to a depth of 320 feet bgs. An 24-inch casing (0.250 inches thick) was placed from the surface to a depth of 10 feet bgs, and a 12-inch SDR17 PVC casing was placed from the surface to 200 feet bgs. An annular seal was placed to 115 feet bgs. Nine screened intervals of stainless steel casing were placed between 193 feet bgs and 314 feet bgs. The water table was encountered at 105.9 feet bgs. These well parameters were consolidated in Table 1.

Current PWS well construction standards can be more stringent than when a well(s) was constructed. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the regulations deal with screening requirements, aquifer pump tests, use of a down-turned casing vent, and thickness of casing. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells.

Regulations for steel pipe thickness based on size of pipe

Size of pipe (inches)	Thickness (inches)
≤6	0.280
8	0.322
10	0.365
12-20	0.375

Well tests are required at the design pumping rate for 24 hours or until stabilized drawdown has continued for at least six hours when pumping at 1.5 times the design pumping rate.

Well #4 and Well #7 appear to have met all current construction standards. DEQ granted a waiver which allowed the usage of a PVC casing in Well #7.

Table 1. Tamarack Resort well construction summary.

	Well Tag No.	Well Depth (feet)	Casing Diameter (inch)	Casing Thickness (inch)	Casing Depth (feet)	Water Table Depth (feet)	Screened Interval (feet)	Surface Seal Depth (feet)	Year Drilled	Well Log Avail.	IDWR/ DEQ Standards Met?
Well #4	29486	412	10 6	0.365 0.288	+2-302 281-305 342-365	137	305-342 365-412	0-302	2003	Yes	Yes
Well #7	31852	320	24 14 12	0.250 0.250 PVC sch17	+2-10 +2-+6 +1-200	105.9	193-314 (10 intervals)	0-165	2004	Yes	Yes

Potential Contaminant Sources and Land Use

The potential contaminant sources and land use within the delineated zones of water contribution are assessed to determine each well's susceptibility. When agriculture is the predominant land use in the area, this may increase the likelihood of agricultural wastewater infiltrating the ground water system. Agricultural land is counted as a source of leachable contaminants and points are assigned to this rating based on the percentage of agricultural land.

In terms of potential contaminant sources and land use, Well #4 and Well #7 each rated **moderate susceptibility** for IOCs (e.g., nitrates, arsenic), VOCs (e.g., petroleum products), SOCs (e.g., pesticides), and for microbial contaminants (e.g., bacteria).

The potential contaminant sources existing within the delineated capture zones include a rare earth mine, a golf course, a transportation corridor, and Cascade Reservoir. A complete list of the potential contaminant sources is included in Appendix A of this report (Table 3 and 4, page 12). The map shown in Figure 2 symbolizes the potential contaminant sources within the each well's capture zones. The contaminant sources have been labeled with unique map identifiers (i.e., Map IDs) to reference with the corresponding list of potential contaminant sources in Appendix A.

Final Susceptibility Ranking

Detection above a drinking water standard MCL, any detection of a VOC or SOC, or a confirmed microbial detection at the drinking water source will automatically give a high susceptibility rating, despite the land use of the area, because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a well will automatically lead to a high susceptibility rating. Having multiple potential contaminant sources in the 0- to 3-year TOT zone (Zone IB) contributes greatly to the overall ranking. In this case, neither of the wells received an automatically high rating for any of the potential contaminants.

Susceptibility Summary

In terms of total susceptibility, Well #4 rated **moderate susceptibility** for IOCs and SOCs, and low susceptibility for VOCs and microbial contaminants. Well #7 rated **moderate susceptibility** for IOCs, VOCs, SOCs and microbial contaminants. The hydrologic sensitivity scores were **moderate susceptibility** for both wells. System construction rated **low susceptibility** for Well #4 and Well #7. The potential contaminant/land use scores for each well was **moderate susceptibility** for IOCs, VOCs, SOCs, and microbial sources. Refer to Table 2 for a summary of the Tamarack Resort Well #4 and Well #7 susceptibility evaluation.

Table 2. Summary of Tamarack Resort Well #4 and Well #7 susceptibility evaluation.

Drinking Water Source	Susceptibility Scores[1]									
	System Construction	Potential Contaminant Inventory/Land Use				Hydrologic Sensitivity	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #4	L	M	M	M	M	M	M	L	M	L
Well #7	L	M	M	M	M	M	M	M	M	M

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility; IOC = Inorganic chemical, VOC = Volatile organic chemical, SOC = Synthetic organic chemical

There are no major issues affecting tested water from this system. According to SDWISS, no VOCs, SOCs, or microbial bacteria have ever been detected in any of the wells. The IOCs fluoride, sodium, nitrate, nickel, and barium have been detected, but at concentrations below MCLs set by EPA.

Section 4. Options for Drinking Water Protection

This source water assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Characteristics of an Effective Drinking Water Protection Program

An effective drinking water protection program is tailored to the particular drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies.

Drinking water protection activities for Tamarack Resort should first focus on correcting any deficiencies outlined in the sanitary survey. The purpose of this survey is to inspect a water system every five years, to evaluate the physical condition of that water system's components and its capacity.

It is important to maintain the well's 50-foot setback as an additional protection measure by keeping the pump house clean and not storing disinfection chemicals or other chemicals within this building.

The water system should restrict chemical application and activities near the wellhead. Maintaining the buffer distance reduces the likelihood of contamination related to chemical application or irrigation practices.

Surface water sources located within 200 feet of the wellhead can be a potential source for contamination. Streams, canals, or ditches can transport many types of chemical contaminants that can move quickly, infiltrate soils, and possibly be drawn into ground water.

Any on-site septic systems should be identified and evaluated with respect to effluent discharge near the wellhead.

Protection of the area near the well is crucial, but all aspects of the water system are equally important: other deficiencies can include acquiring a certified Substitute Responsible in Charge Operator, having the ability to isolate the pressure tanks, and developing a written cross connection control program. Furthermore, developing a cross connection control plan will assist the water system in educating homeowners about back flow prevention devices to help reduce the possibility of used water entering distribution lines.

Focus on Long-Term Management Strategies

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies, even though these strategies may not yield results in the near future. It is therefore recommended that Tamarack Resort consider developing a drinking water protection plan.

Important aspects of a drinking water protection plan include documenting and ranking the potential contaminant sources, outlining best management practices, and educating residents about their drinking water. Multiple resources are available to help communities develop a drinking water protection plan, including the Drinking Water Academy of the EPA. Working with the County, the local Soil Conservation District, and vicinity landowners will better inform the water system of chemicals that may be used, stored, or applied near the drinking water well.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g., zoning, permitting) or non-regulatory in nature (e.g., good housekeeping, public education, specific best management practices). For assistance in protection strategies, please contact the DEQ Boise Regional Office or the Idaho Rural Water Association (IRWA).

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Boise Regional DEQ Office	(208) 373-0550
State DEQ Office	(208) 373-0502
Website:	http://www.deq.idaho.gov/

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (harperm@idahoruralwater.com) with IRWA, at (208) 343-7001, for assistance with drinking water protection strategies.

List of Acronyms and Definitions

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

bgs (Below Ground Surface) – Depth below the surface of the ground.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as "Superfund" is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few heads to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of storm water runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is FEMA data for the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within a priority one area.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

Sanitary Survey – An onsite review of the water source, facilities, equipment, operation, and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation, and maintenance for producing and distributing safe drinking water.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environment Managers, 1997. "Recommended Standards for Water Works."

Idaho Division of Environmental Quality Ground Water Program, October 1999. Idaho Source Water Assessment Plan.

Idaho Department of Environmental Quality. 2003. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Environmental Quality. Safe Drinking Water Information System State(SDWISS).

Idaho Department of Environmental Quality Spatial Database Engine (SDE).

Idaho Department of Environmental Quality, 2006. Source Water Assessment Capture Zone Delineation, PWS #4430100 – Tamarack Resort

Idaho Department of Water Resources, 2003, Well Driller's Report for Tamarack Resort. Tag No. 29486.

Idaho Department of Water Resources, 2004, Well Driller's Report for Tamarack Resort. Tag No. 31852.

Appendix A. Tamarack Resort Well #4 and Well #7 Potential Contaminant Source Inventories

Table 3. Tamarack Resort Well #4 and #7 potential contaminant sources.

Map ID	Contaminant Description[1]	TOT Zone[2] (years)	Source of Information	Potential Contaminants[3]
1	Rare Earth Mine	0-3 YR	Database Search	IOC, VOC, SOC
	Golf Course	0-3 YR	GIS Map	IOC, SOC
	West Mountain Road	0-3 YR	GIS Map	IOC, VOC, SOC, Microbial Contaminants
	Cascade Reservoir	0-3 YR	GIS Map	IOC, VOC, SOC, Microbial Contaminants

[1] Refer To Potential Contaminant Inventory List Of Acronyms And Definitions
[2]TOT = Time-of-travel (in years) for potential contaminant to reach the wellhead
[3]IOC = Inorganic chemical; VOC = Volatile organic chemical; SOC = Synthetic organic chemical

Appendix B. Tamarack Resort Well #4 and Well #7 Susceptibility Analysis Worksheets

Susceptibility Analysis Formulas

Intermediate Scoring for System Construction, Hydrologic Sensitivity, and Potential Contaminant/Land Use:

0 – 1 Low
2 – 4 Moderate
5 – 6 High

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.273)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility
6 - 12 Moderate Susceptibility
≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name: TAMARACK RESORT 4430100 Source: WELL #4 Date: 4/17/2006

1. System Construction		SCORE
Drill Date	7/05/03	
Driller's Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	NO	NOT CONDUCTED YET
Well meet construction standards	YES	0
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	YES	0
Highest production 100 feet below static water level	YES	0
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		0 (Low)

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	NO	0
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	YES	0
Total Hydrologic Score		3 (Moderate)

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	FORESTED	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0

Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	4	3	4	2
(Score = # Sources X 2) 8 Points Maximum		8	6	8	4
Sources of Class II or III leacheable contaminants or	YES	3	2	3	
4 Points Maximum		3	2	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	<25% Irrigated Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		11	8	11	4
Cumulative Potential Contaminant / Land Use Score		3 (M)	2 (M)	3 (M)	2 (M)
4. Final Susceptibility Source Score		6	5	6	5
5. Final Well Ranking		Moderate	Low	Moderate	Low

Ground Water Susceptibility Report Public Water System Name: TAMARACK RESORT 4430100 Source: WELL #7 Date: 4/17/2006

1. System Construction		SCORE			
Drill Date	10/06/04				
Driller's Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	NO	NOT CONDUCTED YET			
Well meet construction standards	YES	0			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	YES	0			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		1 (Low)			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	NO	0			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	YES	0			
Total Hydrologic Score		3 (Moderate)			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	FORESTED	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	4	3	4	2
(Score = # Sources X 2) 8 Points Maximum		8	6	8	4
Sources of Class II or III leacheable contaminants or	YES	3	2	3	
4 Points Maximum		3	2	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	<25% Irrigated Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		11	8	11	4
Cumulative Potential Contaminant / Land Use Score		3 (M)	2 (M)	3 (M)	2 (M)
4. Final Susceptibility Source Score		8	7	8	7
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate

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